

TABLE OF PERMIT MODIFICATIONS

United States Department of Energy / Savannah River Site

SC1 890 008 989

Aiken, Allendale, and Barnwell Counties

Issuance Date	Location	Description of Change
November 6, 2014	Appendix VIII-A	Added remedy selection for Tanks 5 and 6 in the F-Area Tank Farm
July 2, 2015	IVD.B.1	Deleted reference to add GWPS for the NE, NW & SE plumes and going to one GWPS table
	Appendix IVD - A	Added comprehensive GWPS table for all four plumes of the MWMF
	Appendix IVD - C	Completed requirement for revised pages of renewal application for GWPS
September 29, 2015	Appendix VIII-A	Added remedy selection for C-Area Operable Unit
January 29, 2016	Module VC	Renewed the module for the Transuranic Waste Pads 3-6, 14-19, & 26 Facility (TRU Pads) Allow for storage of ignitable and reactive wastes Document closure of Pad 16
May 6, 2016	Module VII	Renewed the module for the Solvent Storage Tanks (SST) S32 – S36 Facility
August 31, 2016	Appendix VIII-A	Added remedy selection for the H-Area Tank Farm to include Waste Tank 16
August 31, 2016	Appendix IVA-A	Added mercury to the GWPS for the M-Area HWMF
December 7, 2016	Cover page	Facility contact changed to J DeMass

MODULE IV

SECTION A

M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities

Module IVA.

IVA.A. MODULE HIGHLIGHTS

The conditions of this module apply to the post-closure groundwater requirements for the M-Area and Metallurgical Laboratory (MAML) Hazardous Waste Management Facilities (HWMFs) identified and described in condition IIIA.B. This module presents permit conditions which address the regulatory requirements for the groundwater corrective action program based on R.61-79.264.117-120, 264.310(b) and 264.100.

In general, the groundwater permit conditions describe the groundwater monitoring and corrective action programs for the M-Area and Metallurgical (Met) Lab HWMFs as defined in the approved permit application (2000 RCRA Part B Renewal Application, rev. 10). The groundwater monitoring portion of the permit describes the location, number, and depth of groundwater monitoring wells; identifies which wells are upgradient and downgradient of the MAML; establishes a list of hazardous constituents and concentration limits which must be achieved through corrective action; defines the length of the compliance period; specifies the sampling and analysis protocols for the groundwater corrective action monitoring program, the statistical evaluations to be conducted, and the procedures for modifying the permit if any changes in the corrective action or corrective action monitoring programs are necessary. The corrective action portion of the permit consists of a description of the overall strategy for groundwater and vadose zone remediation and provides for the submittal of detailed corrective action plans containing information required to implement necessary additional phases of remediation.

IVA.B. GROUNDWATER REQUIREMENTS

IVA.B.1. Groundwater Protection Standard

The Permittee shall ensure that the groundwater protection standard (GWPS), as required under R.61-79.264.92, is being met or that remedial actions are being taken to reduce contaminant levels to meet standards. The GWPS shall consist of the Hazardous Constituents and their corresponding concentration limits as established under R.61-79.264.93 and R.61-79.264.94. See Section I of Appendix IVA-A for the M-Area and Section I of Appendix IVA-C for the Met Lab.

IVA.B.2. Point of Compliance

The point of compliance (POC) is a vertical surface located at the hydraulically downgradient limit of the Waste Management Area (WMA) that extends down to the base of the uppermost aquifer underlying the regulated unit. The WMA for the M-Area HWMF includes one closed surface impoundment, an overflow ditch, seep area, and a Carolina Bay (Lost Lake). Combined, these all comprise the M-Area RCRA hazardous waste management unit. The WMA for the Met Lab HWMF includes one closed surface impoundment, a drainage outfall at the impoundment, and an adjacent Carolina Bay. Combined, these all comprise the Met Lab RCRA hazardous waste management unit. See Figure IVA-1 for a general view of these areas.

IVA.B.4.i. The Permittee shall properly abandon any well(s) not meeting the standard of permit condition IVA.B.4.h. A proposal including specific well abandonment procedures shall be submitted to the Department for review and approval at least fifteen (15) days prior to beginning abandonment procedures.

IVA.B.5. Corrective Action Program

The Permittee shall implement a corrective action program that prevents hazardous constituents from exceeding their respective concentration limits specified in Section I, Appendix IVA-A and Appendix IVA-C of this permit.

IVA.B.5.a. The Permittee shall conduct corrective action to remove and treat hazardous constituents as specified in the groundwater protection standard of permit condition IVA.B.1 and to prevent hazardous constituents from exceeding their respective concentration limits in groundwater. The Permittee shall conduct corrective action by operating vacuum extraction units and passive vapor extraction wells within the vadose zone, by stripping volatile contaminants from groundwater within airlift recirculation wells, and by extracting contaminated groundwater as described in Volume III, Section E.8.3 of the approved permit application. The existing phase of corrective action for the M-Area HWMF consists of the extraction and treatment of contaminated groundwater from recovery wells in the central sector and northern sectors of the contaminant plume. In the southern sector, the existing phase of corrective action for the M-Area HWMF consists of the continuous operation of four (4) of the original twelve airlift recirculation wells (SSR-008, SSR-009, SSR-011 and SSR-012).

As identified in permit conditions IVA.B.5.c through IVA.B.5.p, additional phases of corrective action sufficient in scope to address the remediation of contamination in the vadose zone, central, northern, southern, and western sectors of the M-Area, as well as in the Met Lab HWMF vicinity, are necessary such that the groundwater protection standard of permit condition IVA.B.1 may be achieved.

IVA.B.5.b. The Permittee shall continue corrective measures during the compliance period specified in permit condition IVA.B.3 to the extent necessary to ensure that the groundwater protection standard of permit condition IVA.B.1 is not exceeded. If corrective action is required beyond the compliance period, corrective action must continue until the groundwater protection standard has not been exceeded for three (3) consecutive years in accordance with R.61-79.264.100(f).

IVA.B.5.c. The Permittee shall implement a Phase 3 corrective action program for the southern sector of the M Area groundwater contaminant plume to augment the remaining four (4) operating airlift recirculation wells. The Phase 3 corrective action program is to capture and remediate those portions of the plume delineated by the 500 ug/l trichloroethene isoconcentration contour. The Permittee shall implement additional phases of corrective action as necessary to capture and/or remediate the remainder of the Southern Sector plume above concentrations identified in the groundwater protection standard of permit condition IVA.B.1. **The Permittee shall evaluate the use of amendments to the Lost Lake Aquifer in the Southern Sector as described in the Temporary Authorization issued May 22, 2017 (Scaturo to Meyer) and as described in Volume III, Section E.8.3 of the approved permit application. A small tank system which uses contaminated groundwater, will be used in this deployment and it shall meet the applicable requirements of the SCHWMR 264 Subpart J and 270.16. The Permittee shall evaluate the performance of the overall corrective action system and implement any modifications to the system deemed necessary following the evaluation.**

The Permittee shall also implement a Phase 2 of corrective action program for the remediation of contaminated groundwater within the western sector of the M-Area contaminant plume as described in Volume III, Section E.8.3 of the approved permit application which is beyond the zone of capture of existing groundwater recovery wells RWM-1 through RWM-11. Following the completion of the Phase 1, M-Area Basin DUS source term removal and solvent destruction, the post characterization assessment must be completed to document system effectiveness. Phase 2 will identify and evaluate all remedial technologies to augment contaminant plume collapse and achieve the groundwater protection standard of permit condition IVA.B.1. Evaluate the performance of the overall corrective action system and implement any modifications to the system deemed necessary following the evaluation.

IVA.B.5.d. (DELETED)

IVA.B.5.e. The Permittee shall include the most recent (at the time of plan preparation) hydrogeologic characterization and contaminant plume distribution data in the Phase 2 corrective action plan for the western sector.

IVA.B.5.f. (DELETED)

IVA.B.5.g. (DELETED)

IVA.B.5.h. The Permittee shall implement Phase 3 corrective action within the northern sector of the M-Area groundwater contaminant plume as described in Volume III, Section E.8.3 of the approved permit application. Phase 1 implemented the continuous extraction and treatment of contaminated groundwater from recovery well RWM-12. Phase 2 consisted of continuous extraction and treatment of contaminated groundwater from already installed recovery wells. **The Permittee shall continue to maintain and operate production wells 905-20A and 905-53A to capture a portion of the groundwater contaminant plume within the Crouch Branch Aquifer** downgradient of the highest concentration source area (SRNL Complex). Phase 3 will continue to remediate the highest concentration portions of the contaminant plume and prevent the off-site migration of the plume. Phase 3 shall follow the conditions outlined in the Temporary Authorization dated July 16, 2012 (Haynes to Kostelnik) and in the Northern Sector Remediation System Evaluation portion in Section E.8.3 of the approved permit application. It will also evaluate the effectiveness of the A-2 Air Stripper system and the impact of its shutdown. Phase 3 corrective action shall propose remediation technology to capture and remediate the northern sector plume, to include contamination within the Crouch Branch aquifer, above concentrations identified in the groundwater protection standard of permit condition IVA.B.1. and implement any modifications to the system deemed. The schedule for implementation of the corrective action plan is included as Appendix IVA-F of this permit.

- IVA.B.5.i. The Permittee implemented corrective action in the vicinity of the Metallurgical Laboratory HWMF as described in Volume III, **Section E.8.3** of the approved permit application. This remediation is to capture and remediate the contaminant plume above concentrations identified in the groundwater protection standard of permit conditions IVA.B.1. The current recovery well and passive soil vapor extraction has decreased the concentration of VOCs. Modifications to the system may be appropriate to achieve the groundwater protection standard for the Met Lab HWMF.
- IVA.B.5.j. (DELETED)
- IVA.B.5.k. (DELETED)
- IVA.B.5.l. (DELETED)
- IVA.B.5.m. (DELETED)
- IVA.B.5.n. The Permittee has implemented a corrective action program for contaminated soils within the vadose zone beneath the A-014 Outfall, 321-M Solvent Storage Area, M-Area Process Sewer Line, and the M-Area HWMF as described in Volume III, **Section E.8.3** of the approved permit application. This program currently uses active and passive vapor extraction to treat contaminated soil as necessary. In the event that the current remediation is no longer effective, the need for additional remediation will be evaluated.
- IVA.B.5.o. The Permittee shall continue to evaluate the performance of the existing groundwater corrective action system located in the central sector of the M-Area contaminant plume. Modifications to the system may be necessary if portions of the contaminant plume are found to be beyond the remedial influence of the current recovery system.
- IVA.B.5.p. The Permittee shall continue to investigate remedial alternatives for the groundwater plume associated with the ABRP/MCB/MBP units. The Department has agreed to the suspension of the airlift recirculation wells. **A path forward for corrective action is described in Volume III Section E.8.3 of the approved permit application.**
- IVA.B.6. **Sampling and Analysis Procedures**
The Permittee shall use the following techniques and procedures when obtaining samples and analyzing samples from the groundwater monitoring wells described in condition IVA.B.4.b to provide a reliable indication of the quality of the groundwater as required under R.61-79.264.97(d) and (e).
- IVA.B.6.a. Samples shall be collected, preserved, and shipped in accordance with the procedures specified in Volume I, Section E of the approved permit application. Metals analyses shall be for total metals.
- IVA.B.6.b. The Permittee shall ensure the frequency of sample collection and the wells to be sampled are in accordance with the Groundwater Monitoring Schedule, Appendix IVA-E of this permit.

APPENDIX IVA-B

SAVANNAH RIVER SITE M-AREA HWMF GROUNDWATER MONITORING NETWORK

<u>I. POINT OF COMPLIANCE WELLS</u>	
<u>Aquifer Zone</u>	<u>Well Number</u>
M-Area	MSB-1DR ^d , MSB-2DR^d , MSB-3DRR ^{1,d} , MSB-4DR ^d , MSB-5A ^d , MSB-6A ^d , MSB-7A ^d , MSB-8A ^d , MSB-13D ^d , MSB-59DRR ^{1,d} , MSB-62D ^d , MSB-63D ^d , MSB-64DR^d
Upper Lost Lake	MSB-1C, MSB-2CR , MSB-3CR ¹ , MSB-4CR , MSB-5C, MSB-6C, MSB-7C, MSB-8C, MSB-13CC, MSB-62C, MSB-63C, MSB-64C
Lower Lost Lake	MSB-1B, MSB-2BR , MSB-3BR ¹ , MSB-4BR , MSB-5B, MSB-6B, MSB-7B, MSB-8B, MSB-13A, MSB-62B, MSB-63B
Middle Sand of the Crouch Branch Confining Unit	MSB-39A

<u>II. BACKGROUND MONITORING WELLS</u>	
<u>Aquifer Zone</u>	<u>Well Number</u>
M-Area Green Clay Confining Zone Upper Lost Lake	MSB-29D
M-Area Green Clay Confining Zone	MSB-43D

II. M-AREA BACKGROUND MONITORING WELLS continued

Upper Lost Lake	MSB-29C, MSB-43B
Lower Lost Lake	MSB-29B, MSB-43A

III. M-AREA PLUME DEFINITION WELLS

<u>Aquifer Zone</u>	<u>Well Number</u>
M-Area	AOB-1 ASB-3AR ^h , ASB-5AR ^h , ASB-8 MOX-6 ^{2,d} , MOX-8 ^{2,d} MSB-10C ^{2,d} , MSB-11F ^{c,d} , MSB-14C ^{2,d} , MSB-15D, MSB-16C ^{c,d} , MSB-19C, MSB-20C ^g , MSB-21C, MSB-23R, MSB-24, MSB-26, MSB-27, MSB-28, MSB-31C, MSB-36D, MSB-39D, MSB-42D, MSB-46C, MSB-47D ^h , MSB-48D ^h , MSB-49D, MSB-60D, MSB-65D, MSB-66D, MSB-67D, MSB-70D ^g , MSB-74D, MSB-82D , MSB-87CR
Green Clay Confining Zone	MSB-32, MSB-34C
M-Area Green Clay Confining Zone	MSB-55D ^h
Upper Lost Lake	AC-3A, ASB-2CR ^h , ASB-3CR ^h , ASB-5C ^h , ASB-6C ^h , ASB-8C ^h , ASB-9C ^h , ASB-10CR ^h MSB-11C ^c , MSB-12B , MSB-14B ² , MSB-15A ^c , MSB-17B^g , MSB-18A ^g , MSB-18B^g , MSB-23BR, MSB-27B , MSB-28A, MSB-30CC , MSB-31CC, MSB-33C, MSB-34B, MSB-35B, MSB-36C, MSB-37C, MSB-39C, MSB-40C, MSB-42C, MSB-45B, MSB-47C ^h , MSB-48C ^h , MSB-53C ^h , MSB-55HC ^h , MSB-66C , MSB-70C ^g , MSB-74C, MSB-75C, MSB-76C ^g , MSB-77C ^h , MSB-79C SRW-2B^g, SRW-14B^g, SRW-16B^g

	<u>M-AREA PLUME DEFINITION WELLS continued</u>
Lower Lost Lake	<p>ASB-9B^h</p> <p>MSB-9AR, MSB-12A, MSB-14A², MSB-15AA^c, MSB-16A^c, MSB-17BB^g, MSB-19B, MSB-20A^g, MSB-21B, MSB-25A, MSB-26B, MSB-30B, MSB-31B, MSB-33B, MSB-36B, MSB-38C^c, MSB-39B, MSB-40B, MSB-42B, MSB-45A, MSB-47B^h, MSB-48B^h, MSB-49B, MSB-51B, MSB-53B^h, MSB-55C^h, MSB-66B, MSB-68C^h, MSB-69C^h, MSB-71B^g, MSB-72B, MSB-74B, MSB-75B, MSB-77B^h, MSB-79B, MSB-82C^h, MSB-85C^h, MSB-88C, MSB-89B</p> <p>SRW-14A^g, SRW-16A^g</p>
Middle Sand of the Crouch Branch Confining Unit	<p>ASB-6AA^h, ASB-8A^h, ASB-8B^h</p> <p>MSB-10A^c, MSB-29A^h, MSB-30AA, MSB-33A, MSB-34A, MSB-36A, MSB-37B, MSB-40A, MSB-41B, MSB-42A, MSB-46A, MSB-48A, MSB-48 TA, MSB-49A, MSB-55B^h, MSB-68B^h, MSB-82A^h, MSB-82B^h, MSB-88B</p> <p>SRW-2A^g</p>

	<u>M-AREA PLUME DEFINITION WELLS continued</u>
Crouch Branch	<p>ASB-6TA, ASB-8TA</p> <p>MSB-12TA, MSB-12TB, MSB-23TA, MSB-23TB1⁴, MSB-23TB3⁴, MSB-23TR, MSB-29TA^h, MSB-34TA, MSB-34TB1⁴, MSB-34TB3⁴, MSB-35TA, MSB-36TA, MSB-37TA, MSB-38TB1⁴, MSB-38TB3⁴, MSB-39TA, MSB-41TA, MSB-41TB1⁴, MSB-41TB3⁴, MSB-42TA, MSB-42TB1⁴, MSB-42TB3⁴, MSB-43TA, MSB-47TA, MSB-52TA1⁴, MSB-52TA3⁴, MSB-52TA5⁴, MSB-55TA^h, MSB-66TA, MSB-69TA^h, MSB-82TA^h, MSB-94TB1⁴, MSB-94TB3⁴, MSB-95TB1⁴, MSB-95TB3⁴, MSB-96TA1⁴, MSB-96TB1⁴, MSB-96TB3⁴, MSB-97TA1⁴, MSB-97TB1⁴, MSB-97TC1⁴, MSB-98TB1⁴ MSB-98TC1</p>

APPENDIX IVA-B (continued)

<u>IV. M-AREA PIEZOMETERS</u>	
<u>Aquifer Zone</u>	<u>Well Number</u>
M-Area	MCB-2 MSB-25, MSB-40D, MSB-53D, MSB-56D, MSB-77D
Upper Lost Lake	MSB-24A, MSB-50D BMW 004D, SLW 7, IDP 3C
Lower Lost Lake	AC-2A MSB-11A ^{8,c} SRW-13B IDP 3B
Middle Sand of the Crouch Branch Confining Unit	SRW-13A
Crouch Branch	MSB-21TA, MSB-38TA, MSB-40TA

APPENDIX IVA-B (continued)

<u>V. ABRP/MCB/MBP OU PLUME DEFINITION WELLS⁵</u>	
<u>Aquifer Zone</u>	<u>Well Number</u>
M-Area	ABP-3, ABP-8D MCB-4, MCB-5
M-Area Green Clay Confining Unit Upper Lost Lake	ARP-1A
M-Area Green Clay Confining Unit	ARP-3DR, ARP-4, ARP-19DR
Upper Lost Lake	ABP-3C, ABP-9C ARP-12C ⁴ , ARP-13C1 ⁴ , ARP-13C3 ⁴ , ARP-14C2 ⁴ , ARP-14C3 ⁴ , ARP-15C3 ⁴ , ARP-17C, ARP-20C, ARP-21C MCB-5C, MCB-6C, MCB-7C, MCB-12C, MCB-14C, MCB-15C, MCB-21B2 ⁴ , MCB-22C2 ⁴ , MCB-24C2 ⁴ , MCB-26C2 ⁴ , MCB-28C2 ⁴
Lower Lost Lake	ABP-9B ARP-12B1 ⁴ , ARP-13B1 ⁴ , ARP-17B MCB-12B, MCB-14B, MCB-15B, MCB-19B, MCB-22B2 ⁴ , MCB-25B, MCB-28B2 ⁴
Middle Sand of the Crouch Branch Confining Unit	ARP-14B1 ⁴ , ARP-15B1 ⁴ , ARP-22A MCB-11B
Crouch Branch	ARP-17TA1 ⁴ , ARP-17TB1 ⁴ , ARP-17TC1 ⁴ , MSB-73TA1 ⁴ , MSB-93TA1 ⁴

APPENDIX IVA-B (continued)

<u>VI. SOUTHERN SECTOR PLUME DEFINITION WELLS & SURFACE WATER LOCATIONS⁶</u>	
<u>Aquifer Zone</u>	<u>Well Number</u>
M-Area	SSM-19D
Upper Lost Lake	SSM-10C ⁴ , SSM-11C ⁴ , SSM-12C ⁴ , SSM-13C ⁴ , SSM-14C ⁴ , SSM-15C ⁴ , SSM-16C ⁴ , SSM-17C ⁴ , SSM-19C ⁴ , SSM-20C ⁴ , SSM-22C ⁴ , SSM-23C, SSM-32C SSL-13B, SSL-13C, SSL-20C, SSL-33C,
Lower Lost Lake	MSB-50B SSL-20B, SSL-30B, SSL-33B SSM-4B, SSM-5B, SSM-10B ⁴ , SSM-11B ⁴ , SSM-12B ⁴ , SSM-13B ⁴ , SSM-14B ⁴ , SSM-15B ⁴ , SSM-16B ⁴ , SSM-17B ⁴ , SSM-19B ⁴ , SSM-20B ⁴ , SSM-21B, SSM-22B ⁴ , SSM-23B, SSM-24B, SSM-25B, SSM-32B, SSM-34B, SSM-36B, SSL-25C
Middle Sand of the Crouch Branch Confining Unit	MSB-75A SSM-11A, SSM-20A, SSM-21A, SSM-22A, SSM-24AL, SSM-25AL, SSM-25TA, SSM-32A, SSM-33A, SSM-34A, SSM-34AA, SSM-35A, SSM-36A
Crouch Branch	MSB-31A, MSB-75TA ⁴ , MSB-75TB ⁴ , MSB-75TC ⁴ SSM-21TA, SSM-32TA, SSM-33TA, SSM-35TA
Surface Water	TIMS-01 ³ , TIMS-03 ³ , TIMS-04 ³

<u>VII. WESTERN SECTOR PLUME DEFINITION WELLS⁷</u>	
<u>Aquifer Zone</u>	<u>Well Number</u>
Upper Lost Lake	MSB-101C, MSB-102C, MSB-103C, MSB-104C, MSB-105C, MSB-108C
Lower Lost Lake	MSB-70B , MSB-101B, MSB-102B, MSB-103A, MSB-104B, MSB-105B, MSB-108B, MSB-110B
Middle Sand of the Crouch Branch Confining Unit	MSB-101A, MSB-102A , MSB-108A
Crouch Branch	MSB-21TB ⁴ , MSB-21TC ⁴ , MSB-30TB ⁴ , MSB-30TC ⁴ , MSB-100TA ⁴ , MSB-100TB ⁴ , MSB-100TC ⁴ , MSB-102TA, MSB-104TA, MSB-108TA

Footnotes:

- ¹ The requirement to sample these monitoring wells is waived until their installation.
- ² These wells are used as alternate point of compliance wells during operation of the WSTS (former DUS) at the M-Area Settling Basin until **MSB-3CR and MSB-3BR** are installed.
- ³ These are surface water monitoring locations.
- ⁴ Multi-level wells that are analyzed for the organic groundwater protection constituents identified in Section I of Appx. IVA-A and field parameters of Section II of Appx. IVA-A of this permit and are not used in synchronous water level events.
- ⁵ These wells are associated with the ABRP/MCB/MBP OU and are sampled per Table E.7-3 as described in Section E.7.3 of the approved permit renewal application (MAML 2000 Part B, rev. 6)
- ⁶ These wells are associated with the the Southern Sector and are sampled per Table E.7-4 as described in Section E.7.3 of the approved permit renewal application.
- ⁷ These wells are associated with the Western Sector and are sampled per Table E.7-5 as described in Section E.7.3 of the approved permit renewal application.
- ⁸ This well is used as an alternate plume definition well during operation of the WSTS at the M-Area Settling Basin.

APPENDIX IVA-F

SAVANNAH RIVER SITE M-AREA AND MET LAB HWMFs

SCHEDULE

NORTHERN SECTOR CORRECTIVE ACTION

Submittal of Phase 3 corrective action plan or schedule of corrective action	Submitted to DHEC April 2014.

SOUTHERN SECTOR CORRECTIVE ACTION

Notify the Department should any Phase I Airlift Recirculation Well stop operation and remain inoperable for a period of time equal to, or in excess of one week.	
Sample and analyze exhaust vapor for trichloroethene and tetrachloroethene quarterly at each operating airlift recirculation well.	
Sample and analyze groundwater at a subset of plume definition wells in Section VI, Appendix IVA-B for trichloroethene, tetrachloroethene, and as appropriate, for pH, specific conductance, dissolved oxygen, and/or water level elevations. A subset of plume definition wells in Section VI, Appendix IVA-B shall be sampled at a frequency appropriate to evaluate airlift recirculation system operation.	
Submit a path forward and /or schedule of corrective action	Submitted to DHEC April 2014.

APPENDIX IVA-F (continued)

WESTERN SECTOR CORRECTIVE ACTION

Submittal of Phase 2 corrective action plan or schedule of corrective action	Submitted to DHEC April 2014.

METALLURGICAL LABORATORY CORRECTIVE ACTION

Submit a path forward and /or schedule of corrective action	Submitted to DHEC April 2014.

VADOSE ZONE CORRECTIVE ACTION

Submit a path forward and /or schedule of corrective action	Submitted to DHEC April 2014.

ABRP/MCB/MBP

Submit a path forward or schedule of corrective action	Submitted to DHEC April 2014.

MISCELLANEOUS ACTIONS

To be added as needed	

respective concentration limits by extracting the contaminated groundwater; treating the extracted groundwater for radionuclides (excluding tritium) and hazardous constituents; and either injecting the treated groundwater into the uppermost aquifer upgradient of the seepage basins or dispositioning by other methods that are consistent with managing the contaminants in the extracted water in accordance with the procedures described in Volume IV, Section E.8 of the approved permit application. This program shall consist of the following objectives: **Phase 1)** Implementation of groundwater extraction and injection system to capture and remediate those portions of the contaminant plume delineated by the 10,000 pCi/ml tritium isoconcentration contour. Details of the groundwater extraction and injection system are contained in Section E.8.3.3 of the approved permit application. This initial phase will prevent these portions of the plumes from further migration and discharge to Four Mile Branch. The groundwater extraction and injection system is no longer operating as it is no longer required to operate. Phase 1 will also provide additional field data which will be used to evaluate the effectiveness of this strategy and aid in designing additional phases, as appropriate; **Phase 2)** Evaluate the performance of Phase 1 including groundwater capture zones; contaminant concentrations downgradient of the Phase 1 system, downgradient of the F-Area inactive process sewer line, and at Four Mile Branch (using seepage and surface water data); treatment system effectiveness; and fate of injected water. **Provide a Phase 2A corrective action plan that will:** **2A-1)** before October 31, 2012 reduce the mass flux (Curies/year) of tritium discharging from the F-Area plume to Four Mile Branch by 70% **2A-2)** before October 31, 2017 reduce the discharge of the remaining Appendix IVB-A constituents to Four Mile Branch (except tritium and I-129) to levels that are less than GWPS **2A-3)** before October 31, 2025 reduce the concentration of I-129 in Fourmile Branch to levels that are less than the GWPS, and **2A-4)** develop and test practicable technologies to be employed for the 2B goals (except tritium). **Provide a Phase 2 B corrective action plan that will:** **2B-1)** before July 31, 2020 reduce the discharge from the F-Area plume of all Appendix IVB-A constituents at the seepage line to levels that are less than the GWPS (except tritium and I-129) **2B-2)** before October 31, 2030 reduce the discharge from the F-Area plume of I-129 at the seepage line to a concentration less than the GWPS and **Phase 2B-3)** will give consideration to technical and economic feasibility of performing these remedial actions successfully; **Phase 3)** Three (3) months after meeting the Phase 2 objectives or by July 31, 2020, whichever comes first, evaluate the performance of Phase 2 and submit a Phase 3 corrective action plan that, upon approval, will capture and remediate the entire contaminant plume above those concentrations listed in the GWPS and/or evaluate the applicability of Alternate Concentration Limits (ACL) and/or a Mixing Zone. If an ACL and/or Mixing Zone is proposed and it is determined that an ACL and/or Mixing Zone is inappropriate, then within three (3) months, submit a Phase 3 corrective action plan that, upon approval, will capture and remediate the entire contaminant plume above those concentrations listed in the GWPS.

Evaluate the performance of the overall corrective action system and implement any modifications to the system deemed necessary to improve its effectiveness. Phase 3 will give consideration to technical and economic feasibility of performing a successful remedial action. The schedule for implementation of the corrective action plan is included as Appendix IVB-C of this permit.

IVB.B.5.c. If the groundwater protection standard is met during the compliance period, the Permittee shall continue corrective action to the extent necessary to ensure that the groundwater protection standard is not exceeded. If corrective action is required beyond the compliance period, it must continue until the groundwater protection standard has not been exceeded for three consecutive years.

IVB.B.6. Sampling and Analysis Procedures

The Permittee shall use the following techniques and procedures when obtaining samples and analyzing samples from the groundwater monitoring wells described in condition IVB.B.4.b to provide a reliable indication of the quality of the groundwater as required under R.61-79.264.97(d) and (e).

IVB.B.6.a. Samples shall be collected, preserved, and shipped (when shipped off-site for analysis) in accordance with the procedures specified in Volume I, Section E of the approved permit application. Metals analyses shall be for total metals.

IVB.B.6.b. The Permittee shall ensure the frequency of sample collection and the wells to be sampled are in accordance with the Groundwater Monitoring Schedule, Appendix IVB-D of this permit.

IVB.B.6.c. Samples shall be analyzed according to the procedures specified in Volume I, Section E of the approved permit application or in the current EPA Manual SW-846 using whichever procedure is more recent at the time of analysis. For those constituents which have established maximum contaminant levels (MCLs), the analytical method chosen must be capable of achieving a practical quantitation limit (PQL) below the established MCL for that constituent. For those constituents which do not have an established MCL, the analytical method must achieve the lowest reasonably achievable PQL based on instrumentation and the analytical method.

IVB.B.6.d. Samples shall be tracked and controlled using the chain of custody procedures specified in Volume I, Section E of the approved permit application.

IVB.B.6.e. Whenever the Permittee changes sampling or analytical contractors the Permittee shall submit to the Department within 30 days of such change a copy of the new sampling program or Laboratory QA/QC Program. The Department will evaluate the new program and determine if it differs significantly from the program in the approved permit application. If the program differs significantly, the Department will notify the Permittee and

require that he submit an application for permit modification pursuant to R.61-79.270.41.

IVB.B.7. Groundwater Surface Elevation

Quarterly, the Permittee shall measure and record the groundwater elevation in all wells listed in condition IVB.B.4.b. These data shall be collected within a thirty (30) day time span. The Permittee will report the water level data with the water quality analytical results as specified in permit condition IVB.B.10. Within 30 days after each sampling, the Permittee shall use the water level data to evaluate the direction and rate of groundwater flow and determine whether the requirements for locating monitoring wells continue to be satisfied. If the Permittee determines that the conditions are no longer satisfied, the Permittee must submit a proposal within 30 days to modify the monitoring system. If the modification is significant, the Permittee will be required to submit an application for permit modification.

IVB.B.8. Background Groundwater Quality

The Permittee shall utilize the data values specified in Appendix IVB-A of the permit as background groundwater quality and shall use these values to perform statistical evaluations of groundwater quality. The Permittee shall reevaluate background groundwater quality data to determine background concentrations for those constituents with a GWPS defined as "background concentration" in Appendix IVB-A. A report identifying background concentrations for these constituents, and the procedures used to determine them, will be submitted within sixty (60) days of the effective date of this permit.

IVB.B.9. Statistical Procedures

The Permittee shall utilize the statistical procedures outlined in Volume IV, Section E.8.4.3 of the approved permit application to evaluate the effectiveness of the corrective action program. These statistical analyses will be included in the annual corrective action reports required in permit condition IVB.B.10.c. If the statistical analyses indicate that the existing corrective action program no longer satisfies the requirements of R.61-79.264.100, the Permittee shall notify the Department within fifteen (15) working days and make the appropriate application for permit modification within ninety (90) days.

IVB.B.10. Corrective Action Groundwater Monitoring Program

IVB.B.10.a. The Permittee shall establish, implement, and maintain a groundwater monitoring program capable of demonstrating the effectiveness of the corrective action program and determining compliance with the groundwater protection standard. Groundwater monitoring and corrective action shall be conducted in accordance with the requirements of R.61-79.264.(97, 100) and as specified by the conditions of the permit.

IVB.B.10.b. (i). The Permittee shall monitor groundwater quality for the list of parameters specified in Appendix IVB-A of this permit following the sampling and analysis plan required by permit condition IVB.B.6.

Samples must be collected in accordance with the schedule specified in Appendix IVB-D during the post-closure period. The Permittee must evaluate water quality data using the statistical procedures specified in permit condition IVB.B.9.

- (ii). The Permittee shall monitor groundwater quality for the list of parameters specified in Appendix IVB-A-1 of this permit following the sampling and analysis plan required by permit condition IVB.B.6. Samples must be collected in accordance with the schedule specified in Appendix IVB-D. The Permittee must evaluate water quality data using the statistical procedures specified in permit condition IVB.B.9. Permit condition IVB.B.10.b.(ii) may be removed via a Class 1 permit modification with prior Department approval pending results of aquatic toxicity studies.

IVB.B.10.c.

Annually, the Permittee shall collect samples from a minimum of twenty percent of the POC monitoring wells specified in Appendix IVB-B to be analyzed for Appendix IX of R.61-79.264 constituents. The specific POC wells selected for Appendix IX analysis will be those with the highest contaminant concentrations. Concentration of tritium, gross alpha, non-volatile beta, cadmium and lead must be considered in making this selection. POC wells from each hydrogeologic zone must be represented. Selection of these wells must be evaluated annually based on groundwater analytical results obtained during the previous year. The Permittee shall propose the wells to be sampled for Appendix IX of R.61-79.264 constituents forty-five (45) days prior to initiation of sampling. If constituents from Appendix IX are found that are not identified as hazardous constituents in Appendix IVB-A (GWPS) of this permit, the Permittee will have the right to resample to confirm the detection. If the Permittee chooses not to resample, the original detection will be considered a valid detection. If detection is confirmed by resampling or the Permittee chooses not to resample, the Permittee must report the concentrations of these constituents to the Department in writing within fifteen (15) days of completing the analysis and submit, within ninety (90) days of receiving analytical results, an application for a permit modification to incorporate the new constituents into the groundwater protection standard of permit condition IVB.B.1.

IVB.B.10.d.

Each quarter, the Permittee shall utilize data collected during that quarter to evaluate the effectiveness of the corrective program. This evaluation shall include a review of available data concerning water quality, water level, recharge, and other significant hydrogeologic information. This information must be reported to the Department annually as required by permit conditions IVB.B.11. c.

IVB.B.10.e.

The Permittee shall treat, store and/or dispose of all groundwater in accordance with applicable federal, state and local laws.

IVB.B.11. Recordkeeping and Reporting

IVB.B.11.a. The Permittee shall enter all monitoring, testing, analytical, and corrective action data obtained pursuant to items IVB.B.1 through IIIB.H.13 of this permit into the operating record as required by R.61-79.264.73(b)(6). Groundwater analytical and elevation data shall also be entered into an electronic database file to be submitted to the Department on diskette. This data, in electronic format, shall accompany reports on the effectiveness of the corrective action program which are identified in condition IVB.B.11.c of this permit.

IVB.B.11.b. [DELETED]

IVB.B.11.c. Reports on the effectiveness of the corrective action program shall be submitted on an annual basis. On or before April 30 of each year, the Permittee shall submit a detailed report describing the effectiveness of the corrective action program for the period from January 1 through December 31 of the previous year. A summary of the effectiveness of the corrective action program during the entire year will be provided in this report. Wells selected for graphs and cross-sections will be representative of worst case plume conditions (maximum transport potential and higher concentration), and be located at approximate proximal, distal and intermediate distances from the respective source areas. This report shall include, at a minimum, the following information:

- (i). Water quality and elevation data in table form for all constituents detected during each quarterly sampling event.
- (ii). Hydrographs for selected wells depicting groundwater elevations through time;
- (iii). Time vs. concentration plots for nitrate, tritium, uranium-238, strontium-90, gross alpha, non-volatile beta and iodine-129 for selected wells;
- (iv). Isoconcentration maps for tritium, nitrate, uranium-238, strontium-90, iodine-129, gross alpha and non-volatile beta depicting each hydrologic unit for the third quarter data. Maps shall include the vicinity of the F-Area HWMF, H-Area HWMF and the Burial Ground Complex. Additional constituents may be mapped if the data review indicates the contamination (above GWPS) is expanding to previously unimpacted hydrologic units, pending Department concurrence;
- (v). Potentiometric maps depicting groundwater flow rate and direction for the three main hydrologic units for the third quarter. Potentiometric surfaces will be included on the isoconcentration maps. Maps shall include the vicinity of the F-Area HWMF, the H-Area HWMF and the Burial Ground Complex;

- (vi). Potentiometric cross-sections and isoconcentration cross-sections of selected wells for nitrate, tritium, uranium-238, strontium-90, iodine-129, gross alpha, non-volatile beta depicting the three main hydrologic units for the third quarter data;
- (vii). Determination and evaluation of any changes to groundwater flow rate and direction for the three main hydrologic units based on gradients;
- (viii). Discussion of the extent and severity of groundwater contamination;
- (ix). Evaluation of water quality data and water elevation data for significant changes. This evaluation should use statistics if contamination is expanding to previously unimpacted areas. The evaluation should consider the POC well system and a representative number of plume wells;
- (x). Evaluation and discussion of all water quality and water elevation data. Trends, and significant changes noted during the year should be described;
- (xi). Recharge (inches of rainfall, quarterly and cumulative);
- (xii). Discussion of injection system(s) operation, volume of chemicals injected and minor modifications to the system, and;
- (xiii). Detailed narrative evaluating and discussing the effectiveness of the corrective action system.

IVB.B.12. Duty of Permittee

The Permittee shall assure that the groundwater monitoring (and corrective action) programs are in compliance with the requirements of R.61-79.264 Subpart F throughout the active life of the F-Area HWMF, during closure and during the post-closure period.

IVB.B.13. Permit Modification

IVB.B.13.a. If the Permittee at any time determines that the corrective action program no longer satisfies the requirements of R.61-79.264.100, 264.101, or permit condition IVB.B.10 for releases of hazardous or non-hazardous constituents listed in Appendix IVB-A (GWPS) that originate from the regulated units or the solid waste management units, he must within 90 days submit an application for a permit modification to make any appropriate changes in the program, as required under R.61-79.264.100(h).

IVB.B.13.b. If the Permittee meets or exceeds the requirements of R.61-79.264.100 and 101 and meets the groundwater protection standards, the Permittee may submit an application for a permit modification pursuant to R.61-79.270.41

to terminate the corrective action program and establish a compliance groundwater monitoring program.

- IVB.B.14. Remediation of groundwater impacted by the F-Area HWMF Inactive Process Sewer Lines (FIPSL) will be addressed in Phase 2 of the F-Area HWMF Corrective Action Program and evaluation of the F & H Phase 3 Groundwater Quality Assessment (1998).

APPENDIX IVB-A

SAVANNAH RIVER SITE - F-AREA SEEPAGE BASINS

GROUNDWATER PROTECTION STANDARD

<u>INORGANIC</u>	<u>CONSTITUENTS</u>	<u>CONCENTRATION LIMIT (mg/l)</u>
Antimony		0.006
Arsenic		0.05
Barium		2.0
Beryllium		0.004
Cadmium		0.005
Chromium		0.1
Cobalt		0.003 Background Concentration
Copper		1.3
(deleted)		-
Lead		0.015
Mercury		0.002
Nickel		0.1
Nitrate		10.0
Selenium		0.05
Silver		0.05
Thallium		0.002
Vanadium		0.0035 Background Concentration
Zinc		5.0

APPENDIX IVB-A cont.

<u>ORGANIC CONSTITUENTS</u>	<u>CONCENTRATION LIMIT (mg/L)</u>
Benzene	0.005
(deleted)	-
Chloroform	0.005
Methylene Chloride	0.005
Phenol	4.5
Tetrachloroethylene	0.005
Trichloroethylene	0.005
Trichlorofluoromethane	1.1

APPENDIX IVB-B

F-AREA HWMF MONITORING WELLS

<u>Background Wells</u>	UAZ of UTRA	FSB-108D
	LAZ of UTRA	FSB-76C
	GA	HSB-85A
<u>Point of Compliance Wells</u>	UAZ of UTRA	FSB-88D, FSB-89D, FSB-90D, FSB-91D, FSB-92D, FSB-93D, FSB-94D(R), FSB-95D(R), FSB-97D, FSB-98D, FSB-99D, FSB-109D
	LAZ of UTRA	FSB-88C, FSB-89C, FSB-90C, FSB-91C, FSB-92C, FSB-93C, FSB-94C, FSB-95C(R), FSB-97C, FSB-98C, FSB-99C
	GA	FSB-96A(R), FSB-97A, FSB-98A(R), FSB-99A, FSB-100A, FSB-101A
<u>Plume Assessment Wells</u>	UAZ of UTRA	FB-14D, FEX-4 FSB-76, FSB-78, FSB-79, FSB-87D, FSB-104D, FSB-112D(R), FSB-114D, FSB-117D , FSB-118D, FSB-120D, FSB-122D, FSB-123D, FSB-124D, FSB-125DR, FSB-126D, FSB-127D, FSB-128D, FSB-129D, FSB-130D, FSB-131D, FSB-132D, FSB-133D, FSB-134D, FSB-135D, FSB-136D, FSB-137D, FSB-138D FSL-1D, FSL-2D, FSL-3D, FSL-4D, FSL-5D, FSL-6D, FSL-7D, FSL-8D, FSL-9D
	LAZ of UTRA	FSB-78C, FSB-79C, FSB-87C, FSB-102C, FSB-104C, FSB-107C, FSB-112C, FSB-113C, FSB-114C, FSB-120C , FSB-121C, FSB-122C, FSB-123C FSL-10C, FSL-11C
	GA	FSB-78A, FSB-78B, FSB-79B, FSB-87BR, FSB-112A, FSB-113A, FSB-114A, FSB-120AR

APPENDIX IVB-C

SCHEDULE FOR CORRECTIVE ACTION PROGRAM

SUBMITTALS AND ACTIVITIES

Evaluation of Phase 2 Corrective Action and submittal of Phase 3 Corrective Action Plan (CAP) and/or ACL/Mixing Zone Demonstration	Three (3) months after Phase 2 objectives are met but no later than July 31, 2020
Submittal of Phase 3 CAP (if ACL/Mixing Zone is determined inappropriate)	Three (3) months after Department's decision regarding ACL/Mixing Zone
Submit revised pages of the 2000 RCRA Part B Application Revision 2	Prior to the issuance of final permit to include revision 2 changes

APPENDIX IVC-A

SAVANNAH RIVER SITE - H-AREA SEEPAGE BASINS

GROUNDWATER PROTECTION STANDARD

<u>INORGANIC CONSTITUENTS</u>	<u>CONCENTRATION LIMIT (mg/l)</u>
Antimony	0.006
Arsenic	0.05
Barium	2.0
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cobalt	0.003 (Background Concentration)
Copper	1.3
(deleted)	-
Lead	0.015
Mercury	0.002
Nickel	0.1
Nitrate	10.0
Selenium	0.05
Silver	0.05
Thallium	0.002
Tin	0.0026 (Background Concentration)
Vanadium	0.004 (Background Concentration)
Zinc	5.0

<u>ORGANIC CONSTITUENTS</u>	<u>CONCENTRATION LIMIT (mg/L)</u>
Benzene	0.005
(deleted)	-
Methylene Chloride	0.005
Tetrachloroethylene	0.005
Trichloroethylene	0.005
Trichlorofluoromethane	1.1

<u>Plume Assessment Wells</u>	UAZ of UTRA	HSB-65C, HSB-67, HSB-68DR, HSB-69, HSB-70, HSB-71, HSB-83D, HSB-84D, HSB-85C, HSB-86C HSB-119D, HSB-120D, HSB-121D, HSB-122D, HSB-126D, HSB-127D, HSB-129D, HSB-131D , HSB-134D , HSB-135D, HSB-136D, HSB-137D, HSB-139D , HSB-145D HSB-150D, HSB-152DR, HSB-153D, HSB-154D HSL-1D, HSL-2D, HSL-3D, HSL-4DR, HSL-5DR, HSL-6D, HSL-7D, HSL-8D
	LAZ of UTRA	HSB-65B, HSB-68C, HSB-70C, HSB-71C, HSB-83C, HSB-84C, HSB-86B, HSB-117C, HSB-119C, HSB-120C, HSB-121C, HSB-126C, HSB-127C, HSB-129C, HSB-131C , HSB-134C , HSB-135C, HSB-136C, HSB-137CR, HSB-139C , HSB-145C , HSB-152C , HSB-153C, HSB-154C, HSB-155C HSL-9C, HSL-10C, HSL-11C
	GA	HSB-84A, HSB-85A, HSB-118A, HSB-139A, HSB- 144A

APPENDIX IVC-C

SCHEDULE FOR CORRECTIVE ACTION PROGRAM

SUBMITTALS AND ACTIVITIES

Plan and schedule for development of an analytical method for Nickel-63.	Within sixty (60) days from the effective date of this permit.
Evaluation of Phase 2 Corrective Action and submittal of Phase 3 Corrective Action Plan (CAP) and/or ACL/Mixing Zone Demonstration	Three (3) months after Phase 2 objectives are met but no later than July 31, 2020
Submittal of Phase 3 CAP (if ACL/Mixing Zone is determined inappropriate)	Three (3) months after Department's decision regarding ACL/Mixing Zone
Submit revised pages of the 2000 RCRA Part B Application Revision 2	Prior to the issuance of final permit to include revision 2 changes

Permittee shall screen the available technologies for implementability, achievability, economic feasibility and overall effectiveness. The Permittee shall provide a brief description of each method which includes an evaluation of its technical and economic feasibility. If a different technology is identified, the Permittee must propose a permit modification to incorporate the identified technology. This review shall be conducted every five years and a summary report is due in accordance with the schedule specified in Appendix IVD-C.

IVD.B.5.b The Permittee shall implement a corrective action program that prevents hazardous constituents from exceeding their respective concentration limits specified in Appendix IVD-A of this permit. The Permittee shall conduct this program for all four (4) plumes in accordance with the approved 2013 Permit Renewal Application.

IVD.B.6. Sampling and Analysis Procedures

The Permittee shall use the following techniques and procedures when obtaining samples and analyzing samples from the groundwater monitoring wells described in condition IVD.B.4. to provide a reliable indication of the quality of the groundwater as required under R.61-79.264.97(d) and (e).

IVD.B.6.a. Samples shall be collected, preserved, and shipped in accordance with the procedures specified in Volume I, Section E of the approved permit application. Metals analyses shall be for total metals.

IVD.B.6.b. The Permittee shall ensure the frequency of sample collection and the wells to be sampled are in accordance with the Groundwater Monitoring Schedule, Appendix IVD-D of this permit. The Permittee shall monitor groundwater quality throughout the compliance period to demonstrate conformance with the GWPS.

IVD.B.6.c. Samples shall be analyzed according to the procedures specified in Volume I, Section E of the approved permit application or in the most current final version of EPA Test Methods for Evaluating Solid Waste SW-846, Standard Methods of Wastewater Analysis using whichever procedure is more recent at the time of analysis. For those constituents that have established Maximum Contaminant Levels (MCL) or Preliminary Remediation Goals (PRG), the analytical method chosen must be capable of achieving a Practical Quantitation Limit (PQL) below the established MCL or PRG. For those constituents which do not have an established MCL or PRG, the analytical method must achieve the lowest reasonably achievable PQL based on instrumentation and analytical method.

IVD.B.6.d. Samples shall be tracked and controlled using the chain of custody procedures specified in Volume I, Section E of the approved permit application.

IVD.B.6.e. Whenever the Permittee changes analytical contractors, the Permittee shall submit to the Department within thirty (30) days of such a change a copy of the new laboratory's South Carolina certification. This certification must state the expiration date, analytical test methods and parameters for which the laboratory is certified. The Department will evaluate the new program and determine if it differs significantly from the program in the approved permit application. If the program differs significantly the Department will notify the Permittee and require submittal of a permit modification pursuant to R.61-79.270.41.

APPENDIX IVD-A
SAVANNAH RIVER SITE – MIXED WASTE MANAGEMENT FACILITY
COMPREHENSIVE
GROUNDWATER PROTECTION STANDARD/MONITORING CONSTITUENTS

I. Groundwater Protection Standard

Constituent	GWPS Concentration
<u>Indicator Parameters</u>	
pH	
Conductivity	
Temperature	
<u>Metals (ug/L)</u>	
Antimony	6
Arsenic	10
Barium	2,000
Beryllium	4
Chromium	100
Cobalt	6 ¹
Copper	1,300 ¹
Lead	15 ¹
Mercury	2
Nickel	390 ¹
Selenium	50
Silver	94 ¹
Thallium	2.0
Tin	12,000 ¹
Vanadium	86 ¹
Zinc	6,000 ¹
<u>Volatile Organics (ug/L)</u>	
1,1-Dichloroethane	2.7 ¹
1,1-Dichloroethylene	7
1,1,1-Trichloroethane	200
1,2-Dichloroethane	5

APPENDIX IVD-B cont.

**SAVANNAH RIVER SITE – MIXED WASTE MANAGEMENT FACILITY
GROUNDWATER / SURFACE WATER MONITORING NETWORK**

Background Wells	POC Wells	Assessment Wells		
Northwest Plume Area continued				
	BGO 12D(R) ¹ BGO 13D(R) ¹ BGO 14A(R) ³ BGO 14C(R) ²	BGO 18D ¹ BGO 19D(R) ¹ BGO 40D ¹ FAB 2MC ²	BGO 53A ³ BGO 53B ² FAB 2 ¹	NWP 02D ² NWP 03C ² NWP 101D ¹ NWP 202C ²
Northeast Plume Area				
	BGO 03A ³ BGO 03C ² BGO 03D(R) ¹ BGO 04D ¹ BGO 05C ² BGO 05D ¹ BGO 06A ³ BGO 06B ² BGO 06C ² BGO 06D ¹ BGO 07D ¹ BGO 08A(R) ³ BGO 08C ² BGO 08D ¹ BGO 09D ¹ BGO 10A(R) ^{3*} BGO 10C ^{2*} BGO 10D(R) ^{1*}	BGO 10B ^{2*} BGO 20AA ^{3*} BGO 20A ^{3*} BGO 20B ^{2*} BGO 20C ^{2*} BGO 20D ^{1*} BGO 21D ^{1*} BGO 22D(X) ^{1*} BGO 23D ^{1*} BGO 44AA ³ BGO 44A ³ BGO 44B ² BGO 44C ² BGO 44D ¹ BGO 51A ^{3*} BGO 51AA ^{3*} BGO 52B ^{2*} BGO 52C ^{2*}	BGX 01A ³ BGX 01C ² BGX 01D ¹ BGX 02B ² BGX 02D ² BGX 03D ² BGX 04A ³ BGX 04C ² BGX 04D ² BGX 05D ² BGX 06DR ² BGX 07D ² BGX 09D ¹ BGX 10D ¹ BGX 11D ¹ BGX 13D ² HMD 01D ² HMD 02D ²	HMD 03D ² HMD 04B ² HMD 04D ² NEP 01D ² NEP 02D ² NEP 03D ² NEP 04D ²

APPENDIX IVD-C

SAVANNAH RIVER SITE - MIXED WASTE MANAGEMENT FACILITY

SCHEDULE FOR CORRECTIVE ACTION PROGRAM

SUBMITTALS AND ACTIVITIES

PERMIT CONDITION	ACTIVITY	DATE DUE
IVD.B.5.i.	Submit summary report on remedial technologies available for tritiated groundwater. This review may be included in the Annual Corrective Action Report.	Every 5 years on the permit effectiveness anniversary date.
IVD.B.1	Submit revised 2013 Permit Renewal Application pages for the GWPS for the NEP, NWP and SEP	Submitted to DHEC Dec. 2014; Modification completed July 2, 2015
IVD.B.5.b	Submit revised 2013 Permit Renewal Application pages for the corrective action programs for all plumes	Submitted to DHEC March 2015 in Revision 2 of 2013 Application
	(deleted)	

APPENDIX IVD-D
SAVANNAH RIVER SITE - MIXED WASTE MANAGEMENT FACILITY
GROUNDWATER MONITORING SCHEDULE
AND PARAMETERS TO BE MONITORED

I. Quarterly

- (A) All groundwater protection standard constituents, inorganic constituents, volatile organic constituents, and field parameters identified in Appendix IVD-A shall be sampled for at all new wells installed pursuant to permit condition IVD.B.4.g. quarterly for one (1) year after installation.
- (B) All surface water locations specified in Appendix IVD-B shall be sampled quarterly for tritium.

II. Semi-Annually

- (A) Water level elevation measurements shall be collected within each of the four groundwater plume areas at all point of compliance, plume assessment, and background wells specified in Appendix IVD-B. All elevation measurements must be collected within a thirty (30) day time period.
- (B) All Groundwater Protection Standard Constituents identified in Section I, Appendix IVD-A of this permit, shall be sampled for at all point of compliance and background wells specified in Appendix IVD-B of this permit.
- (C) Selected wells from Appendix IVD-B^a shall be sampled for tetrachloroethylene and trichloroethylene (Southwest plume only).

III. Annually

- (A) All Groundwater Protection Standard Constituents identified in Section I, Appendix IVD-A of this permit, shall be sampled for at selected assessment wells specified in Appendix IVD-B^a of this permit.
- (B) All constituents identified in Section II of Appendix IVD-A as the Comprehensive Monitoring Constituents shall be sampled for at a minimum of 20% of point of compliance wells to be approved by the Department prior to sample collection pursuant to Permit Condition IVD.B.9.d.
- (C) All Groundwater Protection Standard Constituents identified in Section I of Appendix IVD-A of this permit, shall be sampled for at the Surface Water Locations specified in Appendix IVD-B of this permit.

NOTES: ^a Selected wells listed on Appendix IVD-B will be sampled for corrective action effectiveness monitoring as appropriate based on information needs and progress of any corrective actions in a given year. The list of corrective action effectiveness wells to be sampled will be selected and SCDHEC notified of the selection 45 days prior to sampling.

Solid Waste Management Unit	Remedy Selection
H-Area Tank Farm (HTF) Waste Tank 16	<p>The liquid waste tanks and ancillary structures that have been removed from service under the Industrial Wastewater General Closure Plan and tank-system-specific Closure Modules shall be maintained by conducting annual visible engineered barrier inspections and maintenance as documented in the approved Interim Action Statement of Basis/Proposed Plan (rev.1; 12/15) and the effective Interim Action Record of Decision for the H-Area Tank Farm, Waste Tank 16 (Rev.1, July 2016). An Explanation of Significant Difference will be issued to add additional tanks and ancillary structures as they are removed from service.</p>
H-Area Tank Farm (HTF) Waste Tank 12	<p>The liquid waste tanks and ancillary structures that have been removed from service under the Industrial Wastewater General Closure Plan and tank-system-specific Closure Modules shall be maintained by conducting annual visible engineered barrier inspections and maintenance as documented in the approved Explanation of Significant Difference for Incorporating Tank 12 into the Rev. 1 Interim Action Record of Decision for the H-Area Tank Farm, Waste Tank 16 (Rev.0, December 2016).</p>